PHARMACOLOGICAL PROPERTIES OF *VALERIANA OFFICINALIS*- A REVIEW

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Summary

The present review describes the morphological, phytochemical and pharmacology aspects of *Valeriana officinalis* (Valerianaceae). *Valeriana officinalis* is a hardy perennial flowering plant. Valerian is native to Europe and Asia and has naturalized in eastern North America. Native to Europe and parts of Asia, valerian has been introduced into North America. The major modern and historical uses for valerian are as a sedative and anxiolytic, but it is also used to treat "nervous stomach". It significantly improves subjectively recalled sleep quality compared to placebo and shows a favorable adverse effect profile compared with other commonly prescribed sedative hypnotics and anxiolytics. Historically, the herb used for its sedative/hypnotic, anxiolytic, other neurological condition, cardiovascular properties. So, in this article we are going to discuss about its benefits and an overview of phytochemical and pharmacological profiles.

Keywords: *Valeriana officinalis*; Pharmacognosy; Phytochemistry; Pharmacological profile.

Introduction

According to the Oxford English Dictionary (second edition 1989), *valerian* is derived from a Latin adjectival form of the personal name *Valerius*. The Greek physician, Dioscorides, apparently recommended valerian root to treat myriad disorders including heart palpitations, digestive problems, epilepsy and urinary tract infections[1]. Valerian was recommended by Galen during the second century as a treatment for insomnia. Valerian plants are as attractive as catnip to cats, and it is rumored that the Pied Piper's secret to clearing the streets of Hamlin was a store of valerian under his cloak. Other accounts ascribe its name to the Roman emperor, Publius Licinius Valerianus, who reigned in the 3rd century. Two other ancient names are "nard" and "phu". "Nard" is derived from a Sanskrit word meaning "strong smell" and "phu" or "fu" refers to the usual exclamation of disgust that attends the experience of smelling the dried root.

By the 18 century, valerian was widely used as a sedative and to treat nervous disorders associated with a "restless" digestive tract as well as the "vapors" in women. Other common uses included the treatment of headaches, anxiety, palpitations, high blood pressure, irritable or spastic bowel, menstrual cramps, epilepsy and childhood behavior problems and learning disabilities[2]. During World War I, valerian was used to prevent and treat shell shock in frontline troops, and it was used during World War II to help calm civilians subjected to air raids[3].

Because of valerian's historical use as a sedative, anticonvulsant, migraine treatment and pain reliever, most basic science research has been directed at the interaction of valerian constituents with the GABA neurotransmitter receptor system. These studies remain inconclusive and all require independent replication. Valerian was listed as a sleep aid and anxiolytic on the US national formulary until the 1940's[4].

It fell into disuse as more potent sedative-hypnotic pharmacologic agents became available. Related species have been used in Traditional Chinese Medicine (TCM), Ayurvedic Medicine and African herbal healing practices. *V. fauriei* is used in Traditional Chinese Medicine and Japanese medicine as a sedative, spasmolytic and antidepressant[5-10]. *V. capensis* is used in African traditional medicine as a treatment for epilepsy, hysteria and nervous disorders.

Fig.: *Valeriana officinalis*

Valerian has been used as a medicinal herb since at least the time of ancient Greece and Rome. Hippocrates described its properties, and Galen later prescribed it as a remedy forinsomnia. Valerian can be consumed as a tea.

Ayurvedic Medicine and African herbal healing practices. *V. fauriei* is used in Traditional Chinese Medicine and Japanese medicine as a sedative, spasmolytic and antidepressant. *V. capensis* is used in African traditional medicine as a treatment for epilepsy, hysteria and nervous disorders[11]. In the 1980's valerian again assumed a place of importance as a widely used nonprescription hypnotic and daytime sedative, particularly in France, Belgium, Switzerland, Britain, Russia and Germany[12].

Over 50 tons of valerians are sold each year in France alone. Adolescents and young adults appear to be particularly attracted to valerian and other herbs that affect the central nervous system[13]. The German Commission E has given Valerian root a positive evaluation for use in states of restlessness[14].

MORPHOLOGY: The part of the plant used medicinally is the root or rhizome. The rhizome is light grayish brown, about the size of a finger joint, bearing many rootlets. The fresh root has no odor, while the dried root smells distinctly unpleasant, akin to old gym socks, due to isovaleric acid. The plant itself is 50 to 150 cm tall with pinnate leaves and white or pink hermaphroditic flowers with three stamens; the stem is upright and without branches[15]. It is sometimes used as a border in perennial gardens.

PHYTOCHEMISTRY:

• Iridoid valepotriates (0.5% -2.0%) [16]: valtrates, isovaltrate, didrovaltrate, valerosidate and others

•Volatile essential oil (0.2 – 02.8%) [17]: bornyl isovalerenate and bornyl acetate; valerenic, valeric, isovaleric and acetoxyvalerenic acids; valerenal, valeranone, cryptofaurinol; and other monoterpenes and sesquiterpenes

•Alkaloids (0.01 – 0.05%): valeranine, chatinine, alpha-methyl pyrrylketone, actinidine, skyanthine and naphthyridylmethylketone[18-21] • Lignans: hydroxypinoresinol

Valerian contains over 150 chemical constituents; many are physiologically active. There is substantial variation in the chemical constituents in plants from different sources, growing conditions, processing methods and storage conditions[22]. Even in standardized plant extracts sold in Germany, there is some variation in the amount of different chemical constituents that may account for clinical efficacy. Despite these differences, the clinical effects appear to be remarkably consistent across different preparations[23].

Although the sedative effects of the plant's root have been known for centuries, the exact chemical compounds responsible for its activities have not been identified and agreed upon. There is little correlation between the content of volatile oils and the plant's clinical effects[24]. Valerian's effects on the central nervous system have been variously attributed to valepotriates, their breakdown products (baldrinals), valerenic acid, valerenal and valeranone, and other constituents in the essential oil. *Isovaleric acid* is responsible for the herb's unpleasant aroma. *Actinidine* is a powerful attractant to cats, who will roll in valerian; catnip contains similar chemical compounds[25]. Valerian also seems to be one of several plant species that concentrate chromium and are sometimes used to correct deficiencies of this mineral in developing countries[26].

The essential oil is also thought to contribute to valerian's sedative effects. *Valerenic acid* has spasmolytic and muscle relaxant effects and inhibits the breakdown of gamma aminobutyric acid (GABA) in the central nervous system (CNS) [27]. *Valeric acid* was once considered to be responsible for the sedative effects of this herb, but studies evaluating the isolated compound failed to document any sedative effects.

Roots dried at temperatures less than 40 degrees Centigrade, as the German pharmacopeia requires, contain 0.5% - 2.0% *valepotriates*[28]. Although valepotriates were once thought to be the active ingredients, these compounds are chemically unstable: they

degrade readily, are poorly absorbed and are not found in teas (infusions) and tinctures[29, 30]. Instead, their degradation products, *baldrinals*, are found in such preparations, and may account for much of valerian's sedative effect[31].

The lignan *hydroxypinoresinol* also binds benzodiazepine receptors in the amygdala and is thought to work synergistically with bornyl acetate, valerenic acid, and the valepotriates in terms of valerian's overall sedative effects[32].

PHARMACOLOGICAL ACTIVITIES

***Cardiovascular activity*:** Valerian extract has coronary dilatating and antiarrhythmic effects in rabbits, mice and cats; valepotriates prevented the appearance of acute coronary insufficiency, abolished vasopressin-induced arrhythmia, provoked a short-lived increase of coronary blood flow, and had moderate positive inotropic and negative chronotropic effects[33].

Gastrointestinal activity: Valerian is traditionally used in the treatment of intestinal spasms, colic, and "nervous stomach". Valerian has a bitter flavor, and bitters have historically been used to enhance appetite and digestion. Valerenic acid, valtrate and valeranone exert spasmolytic effects in guinea pig ileum through direct effects on smooth muscle[34].

Anxiolytic or Sedative/Hypnotic activity: In mice, intraperitoneal injections of valerenic acid, valerenal and whole herb extracts produced significant sedation, ataxia and anticonvulsant effects[35]. Intraperitoneal injections of 100 mg/kg had sedative effects as strong as barbiturates; doses of 400 mg/kg led to death. In comparison with diazepam and chlorpromazine, valerian extract had weak anticonvulsive properties. Valerian root extract (Valdispert) reduced motility and increased thiopental-induced and pentobarbital-induced sleeping time. Even the aroma of valerian root exerted sedative effects in mice[36].

Other Neurologic activity: Unlike diazepam, valerian did not affect spontaneous ambulation and rearing or approach-avoidance conflict in mice in a water-lick conflict test. On the other hand, valerian and imipramine significantly inhibited immobility induced by a forced swimming test in rats and significantly reversed reserpine-induced hypothermia in mice, leading researchers to conclude that valerian may be a useful antidepressant[37].

Conclusion

The multiple benefits of *Valeriana officinalis* made it a true miracle of nature. Numerous studies have been conducted on different parts of *Valeriana officinalis*, but this plant has not yet developed as a drug by pharmaceutical industries. In view of the nature of the plant, more research work can be done on humans so that a drug with multifarious effects will be available in the future market.

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